



Claim 1 recites a micro-lens array comprising, *inter alia*, "at least one of said ... first micro-lenses at least abuts without overlapping at least one of said ... second micro-lenses" (emphasis added). Claim 6 recites a micro-lens array comprising, *inter alia*, "a first set of micro-lenses ...; a second set of micro-lenses; and a third set of micro-lenses ..., wherein said first micro-lenses at least abut without overlapping said second and third micro-lenses" (emphasis added). Claim 12 recites a micro-lens array comprising, *inter alia*, "a first set of micro-lenses ...; and a second set of micro-lenses ..., wherein said first micro-lenses abut said second micro-lenses without overlapping" (emphasis added). Claim 17 recites a semiconductor-based imager comprising, *inter alia*, "a micro-lens array ... substantially space-less between at least one of [a] plurality of first micro-lenses and at least one of [a] plurality of second micro-lenses" (emphasis added). Claim 36 recites a semiconductor-based imager comprising, *inter alia*, "said second micro-lenses contact without overlapping said first micro-lenses" (emphasis added). Applicants respectfully submit that Suda does not disclose, teach, or suggest these limitations.

The Office Action refers to FIGs. 15 and 16 to teach "at least one of said plurality of first micro-lenses at least abuts without overlapping at least one of said plurality of second micro-lenses" Office Action p. 3. However, Suda discloses that FIGs. 15 and 16 are only plan views of the "image pickup element ... shown in FIG. 2." Paragraph [0086]. The sectional view of Suda FIG. 2 (reproduced below) shows that the microlenses 111 are separated by a metal wiring layer 108. "[T]he high refraction material layer 111 functions as a microlens having positive power." Paragraph [0057] (emphasis added). Applicants respectfully submit that Suda does not disclose, teach, or suggest the micro-lenses being substantially space-less, in contact, or abutting, as recited in claims 1, 6, 12, 17, and 36.

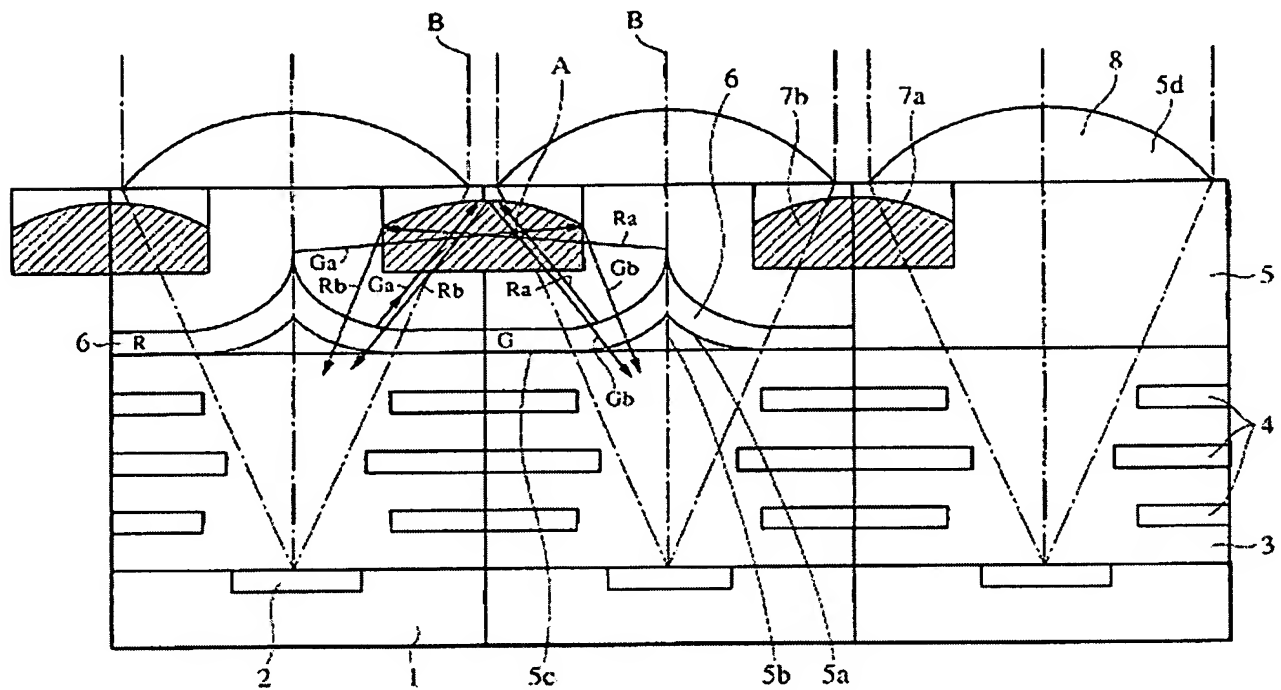
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Claims 1, 17, 24, and 36 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Tsuboi (US 2003/0063210). This rejection is respectfully traversed.

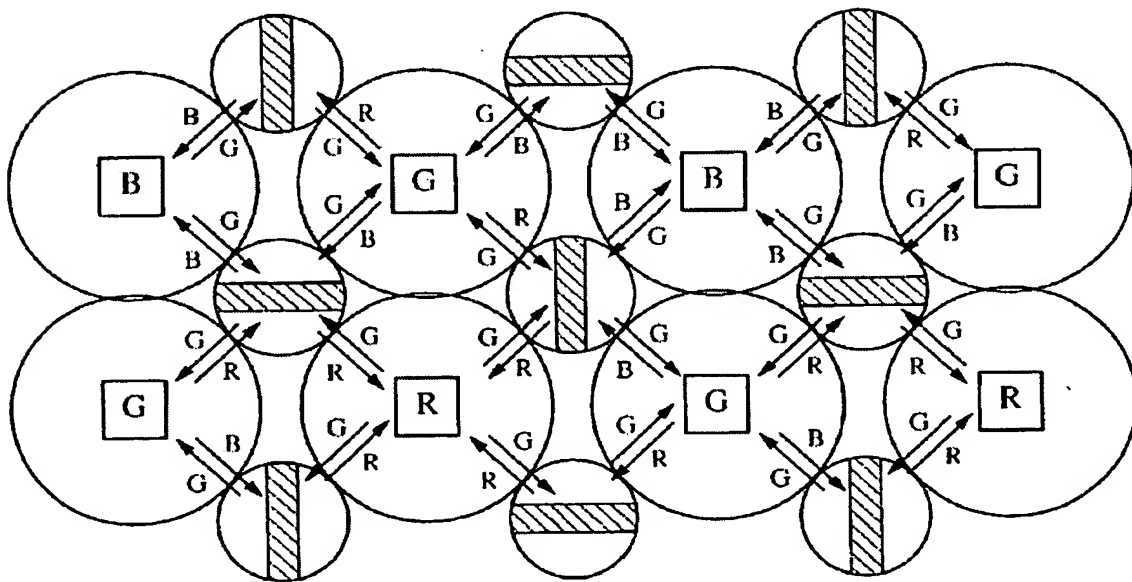
Claim 1 recites a micro-lens array comprising, *inter alia*, "at least one of said ... first micro-lenses at least abuts without overlapping at least one of said ... second micro-lenses" (emphasis added). Claim 17 recites a semiconductor-based imager comprising, *inter alia*, "a micro-lens array ... substantially space-less between at least one of [a] plurality of first micro-lenses and at least one of [a] plurality of second micro-lenses" (emphasis added). Claim 24 recites a semiconductor-based imager comprising, *inter alia*, "a micro-lens array, comprising: a first plurality of first micro-lenses ... and a second plurality of second micro-lenses ... wherein at least one of said plurality of first micro-lenses at least abuts without overlapping at least one of said plurality of second micro-lenses" (emphasis added). Claim 36 recites a semiconductor-based imager comprising, *inter alia*, "said second micro-lenses contact without overlapping said first micro-lenses" (emphasis added). Tsuboi does not disclose, teach, or suggest these limitations.

To the contrary, Tsuboi discloses in FIG. 2 (reproduced below) that the microlenses 8 do not abut, overlap, or contact each other. Tsuboi further discloses that "reflectors 7 ... are placed at each of the four corners of the microlenses 8, ... at the places where the microlenses 8 are not formed when viewed from the light incident direction. ... [T]he reflectors 7 are effectively disposed in optically dead spaces of the solid-state imaging sensor." Paragraph [0037] (emphasis added). Although the Office Action (p. 9) refers to FIG. 1, that figure is not detailed enough to show the structure of Tsuboi as illustrated in FIG. 2.

Tsuboi FIG. 2



Tsuboi FIG. 5



Furthermore, FIG. 5 (reproduced above), which was referenced in the Office Action at p. 2, shows the blue microlenses B, positioned above green microlenses G,

overlap the green microlenses G. (Note the overlap of the circles.) The red microlenses R microlenses R, positioned above green microlenses G, overlap the green microlenses G

Applicants respectfully submit that Tsuboi does not disclose, teach, or suggest the micro-lenses being substantially space-less, in contact, or abutting without overlapping, as recited in claims 1, 17, 24, and 36. Since Tsuboi does not disclose all the limitations of claims 1, 17, 24, and 36, claims 1, 17, 24, and 36 are not anticipated by Tsuboi. Applicants respectfully request that the 35 U.S.C. § 102(e) rejection of claims 1, 17, 24, and 36 be withdrawn.

Claim 38 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Suda. This rejection is respectfully traversed. Claim 38 depends from claim 24, and is patentable at least for the reasons mentioned above, and on its own merits. Applicants respectfully request that the 35 U.S.C. § 103(a) rejection of claim 38 be withdrawn and the claim allowed.

Claims 4-5, 8-9, 22-23, and 40-42 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Suda in view of Li (US 2002/0176037). This rejection is respectfully traversed. Claims 4-5, 8-9, 22-23, and 40-42 depend, respectively, from claims 1, 6, 17, 24, and 36 and are patentable at least for the reasons mentioned above, and on their own merits. Applicants respectfully request that the 35 U.S.C. § 103(a) rejection of claims 4-5, 8-9, 22-23, and 40-42 be withdrawn and the claims allowed.

Claims 18, 24, 33-34, 39, 56, and 61 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Suda in view of Hiroki (JP 2000-260968). This rejection is respectfully traversed. In order to establish a *prima facie* case of obviousness "the prior art reference (or references when combined) must teach or suggest all the claim

limitations.” M.P.E.P. §2142. Neither Suda nor Hiroki, even when considered in combination, teach or suggest all limitations of independent claim 24.

Claim 24 recites a semiconductor-based imager comprising, *inter alia*, “a micro-lens array, comprising: a first plurality of first micro-lenses ... and a second plurality of second micro-lenses ... wherein at least one of said plurality of first micro-lenses at least abuts without overlapping at least one of said plurality of second micro-lenses” (emphasis added). Suda does not disclose, teach, or suggest these limitations.

As discussed above, Suda teaches that “the high refraction material layer 111 functions as a microlens having positive power.” Paragraph [0057]. The sectional view of FIG. 2 (reproduced below) shows that the microlenses 111 are separated by a metal wiring layer 108. Applicants respectfully submit that Suda does not disclose, teach, or suggest at least one of said plurality of first micro-lenses at least abuts at least one of said plurality of second micro-lenses, as recited in claim 24.

Claims 18, 33-34, 39, 56, and 61 depend, respectively, from claims 17, 24, and 36 and are patentable at least for the reasons mentioned above, and on their own merits. Applicants respectfully request that the 35 U.S.C. § 103(a) rejection of claims 18, 24, 33-34, 39, 56, and 61 be withdrawn and the claims allowed.

Claims 24-27, 30-33, and 35 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Hokari (US 5,493,143) in view of Suda. This rejection is respectfully traversed. Neither Hokari nor Suda, even when considered in combination, teach or suggest all limitations of independent claim 24.

Claim 24 recites a semiconductor-based imager comprising, *inter alia*, “a micro-lens array, comprising: a first plurality of first micro-lenses ... and a second plurality of second micro-lenses ... wherein at least one of said plurality of first micro-lenses at least

abuts without overlapping at least one of said plurality of second micro-lenses”
(emphasis added). Hokari does not disclose, teach, or suggest these limitations.

To the contrary, Hokari discloses in FIG. 9 the array of micro-lenses 9R, 9G, and 9B having an appreciable distance between them. Hokari does not teach the micro-lenses being substantially space-less or abutting and recited in claim 24. As discussed above, Suda also does not teach or suggest this limitation. Suda teaches that “the high refraction material layer 111 functions as a microlens having positive power.” Paragraph [0057]. The sectional view of FIG. 2 (reproduced below) shows that the microlenses 111 are separated by a metal wiring layer 108. Thus, Suda does not remedy the deficiency of Hokari.

Since Hokari and Suda do not teach or suggest all of the limitations of claim 24, claim 24 and dependent claims 25-27, 30-33, and 35 are not obvious over the cited references. Applicants respectfully request that the 35 U.S.C. § 103(a) rejection of claims 24-27, 30-33, 35 be withdrawn.

In view of the above, Applicants believe the pending application is in condition for allowance.

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